15¢
$5.50 A YEAR

June 10, 1961

SCIENCE NEWS LETTER

RECEIVED
JUN 1 1961
MIAMI UNIVERSITY
LIBRARY

THE WEEKLY SUMMARY OF CURRENT SCIENCE

Star Field Tracker
See page 357

DEC 61 94A-127 2A
MIAMI UNIV LIBRARY
OXFORD OHIO
RECORD
DEC 61 94A-128 23 6

A SCIENCE SERVICE PUBLICATION

MEDICINE

Cirrhosis in Alcoholics

➤ ONLY ONE in 12 chronic alcoholics get cirrhosis of the liver despite the fact that the disease is seven times as common in alcoholics as in non-alcoholics, the American Gastroenterological Association in Chicago was told.

Dr. Gerald Klatskin of the Yale University School of Medicine challenged the widely accepted belief that alcoholic cirrhosis is a nutritional disorder caused by inadequate food consumption.

Although nutritional factors do play a role in causing cirrhosis, Dr. Klatskin said that this "does not imply that the effects of alcohol on the liver are necessarily due solely to the reduction in food consumption that often accompanies excessive drinking."

Contradicting the food theory are the following facts:

1. Alcholics occasionally develop cirrhosis despite an apparently adequate diet.
2. The disease is rare in non-alcoholics with chronic wasting diseases accompanied by severe malnutrition.
3. Experimental nutritional cirrhosis does not show the striking changes seen in alcoholic-caused cirrhosis.
4. Cirrhosis patients on poor diets frequently show liver improvement through the simple withdrawal of alcohol.

A direct effect on the liver by alcohol not related to food consumption was reported as the result of experiments on rats showing that a single large dose of alcohol promptly raises the fat content of the liver. However, Dr. Klatskin pointed out, long-term alcohol feeding of rats results in a type of fatty infiltration that can be prevented and abolished by the vitamin choline.

• Science News Letter, 79:354 June 10, 1961

Indigestion Remedies

➤ MANY COMMERCIAL remedies for indigestion should be taken from the market, Dr. Kurt J. Isselbacher of Massachusetts General Hospital told the American Gastroenterological Association in Chicago.

"Free" bile salts in commercial preparations are harmful to the intestinal lining, Dr. Isselbacher warned, and physicians as well as pharmacists should be aware of their danger. He reported on fat absorption from the intestines and the enzymatic mechanism of the process that he has found.

"The conversion of fatty acids to neutral fats is obligatory for their absorption," the Boston physician said. "The enzymatic activity is greatest in the upper part of the small intestine, which is the area of major fat absorption."

Dr. Isselbacher said that in addition to acting as detergents to render fat soluble, the bile salts normally secreted by the liver, unlike those in commercial remedies, have an effect upon the intestinal mucosa or lining. They actually stimulate the process involved in conversion of fatty acids to neutral fats and this further aids fat absorption.

Dr. C. Adrian M. Hogben of the George Washington University, Washington, D. C., said "scientists are now convinced that 'active transport' is the basic mechanism responsible for fluid movement in the small intestine."

He reported new concepts on the mechanism of absorption of the six and a half quarts of fluid that pour out into the digestive tract from food and drink and the various digestive glands each day.

A controversy, mainly between British and American physiologists, revolves about whether ions, the dissolved parts of salt molecules, precede or follow the water moving across the intestinal membrane. Dr. Hogben and Dr. Charles Tidball, of GWU, say the ions move first.

• Science News Letter, 79:354 June 10, 1961

MEDICINE

"Vast Expansion" Urged For Medical Research

➤ THE TWO LEADING causes of death were attacked at the President's Conference on Heart Disease and Cancer.

Twenty-two physicians reported in Washington to President Kennedy that not only is a "vast expansion of medical research" needed, but that individuals and communities should be made aware of achievements already attained by scientists in their war to stamp out these killers.

Pointing out the tremendous loss to the nation through illness and death from heart disease and cancer, the physicians recommended a "much higher level of Federal appropriations in support of medical research" and a commensurate increase in voluntary contributions to fight them.

President Kennedy sent a message to Congress based on the report.

Chairman of the conference was Boisfeuillet Jones, special assistant to Secretary Abraham Ribicoff of the Department of Health, Education and Welfare.

Sen. Hubert H. Humphrey (D.-Minn.) has urged a ten-point plan for "total war" against cancer and heart disease. His key proposal is for Federal support for regional centers of biomedical research in the nation's leading universities.

He also is proposing more money to support exchanges of scientists with other countries, to finance pilot research centers abroad, to support international professional societies and other measures.

• Science News Letter, 79:354 June 10, 1961

MEDICINE

Basic Hospital Services Cost $15 to $20 a Day

➤ CHARGES for basic hospital services average from $15 to $20 a day in the United States, a new American Hospital Association survey covering 1960 has reported.

This covers room, board, routine nursing care and minor supplies, but rates vary widely according to type of accommodation, hospital size, ownership and geographical area.

Figures were obtained from 4,692 short-term non-Federal hospitals, 94% of 5,455 such hospitals listed by AHA.

Although a general increase in average charges was noted, the report said this increase probably reflects "not only rising hospital costs but also a trend toward a more realistic balance between charges for routine daily services and unit charges for special services."

• Science News Letter, 79:354 June 10, 1961

MEDICINE

Heart Chamber Fails

➤ CONGESTIVE heart failure may be linked to failure of the atrium, one of the upper chambers of the heart, Dr. Jere H. Mitchell, of the National Heart Institute, National Institutes of Health, Bethesda, Md., said in a prize-winning report that won him $1,000 and a silver medal.

The 32-year-old scientist was the winner of the first American College of Cardiology's Young Investigators' Award. The report was the result of an investigation in collaboration with Dr. Stanley J. Sarnoff, chief of the NHI laboratory of cardiovascular physiology, and Joseph P. Gilmore. Dogs were used in the experiment.

In an interview with SCIENCE SERVICE, Dr. Mitchell said the transport function of the atrium (the subject of his investigation) is much like a booster pump in the circulation.

"It augments the transfer of fluid from the blood pool, or venous bed, into the primary pump or power-generating element of the system, which is the ventricle."

The symptoms of congestive heart failure, he explained, are closely related to a high pressure in the veins and capillaries, and the high venous pressure is generally attributed to an abnormal function of the ventricle. However, Dr. Mitchell said, a failure of atrial function may also be a factor.

The atrium normally provides filling of the ventricle with little elevation in the venous blood system. When the atrium fails, however, a higher pressure in the blood pool, or venous bed, is needed to force the blood into the ventricles.

The amount of filling of the ventricle is one of the determinants of the work of the heart.

Therefore, when the atrium fails, the venous pressure must go up in order to fill the ventricle so the ventricle will do its work.

Dr. Mitchell concluded, therefore, that abnormal atrial function may play a role in the beginning or cause of the elevated pressure observed in congestive heart failure.

• Science News Letter, 79:354 June 10, 1961

NATURAL RESOURCES

Desalted Water by 1966

Desalted water from the ocean and from reservoirs of brackish water will be widely used by 1966 if crash program is maintained, Vincent Marteka reports.

► DESALTED WATER from the ocean and other sources could be widely used as drinking water by 1966, a water expert predicted.

Large-scale salt water conversion plants will be dotting the United States coast and some inland areas within five to seven years if the present fast pace in desalting research is maintained, W. W. Rinne of the U. S. Department of Interior's Office of Saline Water told SCIENCE SERVICE.

The Government agency is directing a crash research and development program for wringing fresh water from salty oceans and brackish waters. It has built a demonstration plant in Freeport, Texas, that is producing 1,000,000 gallons of fresh water a day. Another 1,000,000-gallon-a-day demonstration plant will be operating in San Diego, Calif., by the end of the year, and others are scheduled to be built in various sections of the country.

Interested persons from parched areas of the U. S. are closely watching the program's progress to see if desalted water is the answer to their diminishing water supply. Current studies show that the high cost of salt water conversion could be whittled down to less than 50 cents per 1,000 gallons, or less than one-half its present cost. The cost of fresh water in most U. S. communities now ranges from 30 to 45 cents per 1,000 gallons.

Larger plants must be built to prove that such low costs can be obtained, Mr. Rinne said. The demonstration plants are too small to show the full economic potential of the different desalting methods used.

The freezing process has the greatest potential of all processes tested thus far in desalting the oceans, Mr. Rinne said. Another promising process uses the multi-stage flash evaporator being constructed in San Diego, Calif.

A major part of the developmental program is now slanted toward the freezing process, in which salt water is frozen and crystals of pure water are harvested. Although still in the pilot plant stage, freezing methods have the advantage of low energy requirements with little scaling and corrosion.

Residents of the Great Plains and other inland areas are more interested in processes to convert brackish, or less salty, water into drinkable water.

Huge reservoirs of brackish water left from ancient seas lie waiting underneath the dry earth of the Great Plains and in gently sloping sandy layers just beneath the Texas coastal plain.

Government scientists are now concentrating on a process, adapted for brackish water, that uses thin membranes and an electric current to separate the dissolved salts from the water. A plant using the process is now being built on the plains of South Dakota, 1,000 miles from the nearest ocean.

More research and funds are needed before all the problems of desalting the oceans and brackish waters are solved, Mr. Rinne stressed, but the five demonstration plants scheduled to be operating by late 1962 will help solve them.

• Science News Letter, 79:355 June 10, 1961

SEISMOLOGY

Seismic–Atomic Research

► UNITED STATES scientists will soon begin a world-wide assault on the problem of detecting underground atomic explosions when an existing global network of earthquake recording stations will be updated with new seismic instruments.

High-precision, standardized seismic instruments will be installed in 125 earthquake recording stations scattered throughout the world in an effort to find out how earthquake waves differ from shock waves of atomic explosions. U. S. scientists hope to be able to "fingerprint" earthquake waves into a characteristic profile on a seismogram to rule out any natural explanation in the event of a Russian nuclear explosion.

The program is conducted by the U. S. Coast and Geodetic Survey and is part of Project Vela-Uniform, the Defense Department's research program for detecting underground atomic blasts.

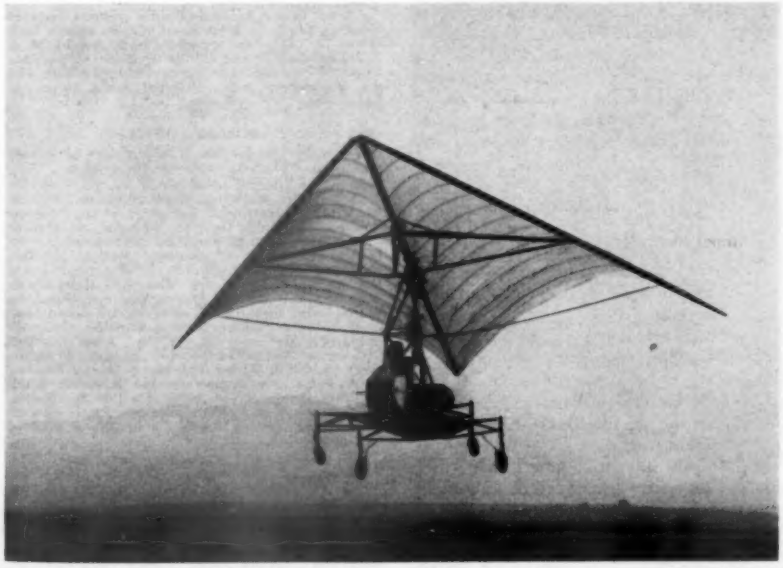
About 65 countries and islands throughout the world will be included in the earthquake network. Noticeably absent are the Russians, who told United States scientists they "already have a standardized network in Russia and Siberia that is adequate for our earthquake studies."

One of the most difficult problems facing nuclear detection experts is the inability to distinguish shock waves of an atomic explosion from those of an earthquake. Scientists hope the basic research data from the network will help separate the garbled waves, traveling through and along the surface of the earth, and pinpointing their exact nature.

All data obtained from the 125 stations will be channeled to an analysis center in Washington, D. C., where it will be available to scientists from all nations of the world.

The network itself is entirely inadequate for monitoring atomic explosions. It was primarily designed for accumulating data on the frequency, location and nature of earthquakes. More than 100 additional stations would have to be built to provide an adequate network for detecting atomic explosions.

• Science News Letter, 79:355 June 10, 1961



FLEX WING IN FLIGHT—A flight vehicle, the Flex wing, using plastic-coated nylon material instead of rigid metal surfaces for the wing, has passed its first test flights. The vehicle was built by Ryan Aeronautical Company, San Diego, Calif.

PHYSICS

Greatest Ray Shower

➤ NEW EVIDENCE supporting the theory that cosmic rays come from outside our galaxy has been obtained from the greatest shower of cosmic ray particles ever detected on earth.

The shower was recorded March 19 at Massachusetts Institute of Technology's Volcano Ranch cosmic ray research station near Albuquerque, N. M. Dr. John Linsley, who directs the station, reports that the shower contained between 20 billion and 40 billion particles. This figure is from two to four times greater than the number of particles contained in the largest previous shower detected by the station in December, 1959.

By "reconstructing" such showers, The Technology Review, June, 1961, explains, the energy of the primary particles responsible for them can be estimated. The March shower resulted from the arrival over New Mexico of a nuclear visitor with far more energy than ever has been imparted to anything with a man-made accelerator. Its energy, in fact, was more than seems likely a particle could have acquired within our galaxy.

The shower appears, therefore, to have been touched off by something from beyond the region 100,000 light years wide and 5,000 light years deep that the Milky Way occupies in space.

Prof. Bruno Rossi of the MIT Laboratory for Nuclear Science, which has been discovering bigger and bigger showers year after year, doubts if the limit has been reached. He has been convinced for some time that there is an extragalactic acceleration mechanism for cosmic rays, and this shower appears to be further evidence of it.

Whether the incident particles that start such showers are protons or ionized nuclei of heavier elements is still uncertain, and much more work appears to be necessary to determine the nature of cosmic particles.

Dr. Linsley is assisted at the station by Peter J. Eccles, a member of the staff of the Laboratory for Nuclear Science and the son of Sir John Eccles, president of the Australian Academy of Sciences. The Volcano Ranch research is supported by the National Science Foundation.

• Science News Letter, 79:356 June 10, 1961

ASTRONOMY

Cosmic Rays Traced to Flares in Stars

➤ THE ORIGIN of the cosmic rays that bombard the earth and make space travel a hazard has been traced to great flares of energy from some 16 billion stars in our galaxy or Milky Way system.

This new theory is put forth by Dr. J. N. Tandon of the University of Delhi in a communication published in Nature, 190:246, 1961. Although cosmic rays have been known for more than 40 years, the explanation of their origin in the depths of space has not been satisfactory.

The new theory accepts the idea that the cosmic particles are accelerated in interstellar space by moving electric fields, as worked out by the atomic pioneer, the late Enrico Fermi. It does not require that particles of great energy come from outside our galaxy as other scientists suggested.

The stars that have enough flare energy to account for the cosmic rays are known as main sequence M-type dwarfs, and Dr. G. P. Kuiper, the American astronomer, estimated there are enough of them in the galaxy to fit the new theory.

• Science News Letter, 79:356 June 10, 1961

SPACE

Three Men to the Moon

➤ IT WILL NOT be just one man on the moon, but a three-member team, as the National Aeronautics and Space Administration in Washington, D. C., now pictures the climax of President Kennedy's rush program to get a manned spacecraft there and safely back within ten years or less.

NASA officials predict that a three-man crew will be necessary to cope with the variety of duties required. These include management of complex electronic controls, plus the ability to meet unforeseen difficulties en route—technological, navigational and biochemical.

And at least one of the men must be a thoroughly trained scientist, capable of returning with valuable data. The trip is not visualized as a mere matter of stepping out on the lunar surface and getting right back into the craft for a fast getaway. Scientific aspects will be of prime importance.

The trip is tentatively seen as taking about two weeks—four to five days' travel time each way, and the remainder for first-hand observation and study of lunar conditions.

No target date has been set, NASA Administrator James E. Webb said, because "if you do not achieve a precise target date, there are always assumptions that the program has gone wrong. If we can achieve it in under ten years, we certainly will. We may set it as early as 1967 so we can move just as fast as we can." Mr. Webb said "Yes" emphatically when asked if the goal was to beat Russia to the moon. But he said the increased budget requests for NASA—61% more for fiscal 1962 than the amount originally submitted—and other agencies involved in space fields represent "an acceleration of the total program, not just the effort to get to the moon. We cannot afford to be behind in any major field of technology."

While work is in progress, there will be no attempt at "a cloak of secrecy," Mr. Webb said. NASA will continue to make full reports to "the world scientific community, and indeed, to the general public."

He believes exchanges of information will increase through the world-wide system of communication and weather satellites also featured in revised budget plans.

He said there would be opposition in some scientific circles to the moon flight prospect. However, some skeptical scientists, when shown advance plans, "had their doubts dissipated when they got thoroughly into the meat of the problem."

As to the very large expenditures involved, Mr. Webb believes "Congress will go along. I believe you'll see favorable action."

NASA's revised budget request now totals $1,784,300,000.

• Science News Letter, 79:356 June 10, 1961

SCIENCE NEWS LETTER
VOL. 79 JUNE 10, 1961 NO. 23

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is addressed. Your new address should include postal zone number if you have one.

Copyright © 1961 by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also publishes CHEMISTRY (eight times a year) and THINGS of science (monthly).

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: William W. Rubey, University of California at Los Angeles; Wallace R. Brode; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University; Henry Allen Moe, John Simon Guggenheim Memorial Foundation. Nominated by the National Research Council: Leonard Carmichael, Smithsonian Institution; John R. Dunning, Columbia University; Benjamin H. Willier, Johns Hopkins University. Nominated by the Journalistic Profession: Michael J. Ogden, Providence Journal-Bulletin; O. W. Riegel, Washington and Lee University; Ralph B. Curry, Flint Journal. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President, Leonard Carmichael; Vice President and Chairman of Executive Committee, Charles E. Scripps; Treasurer: Wallace R. Brode; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Gloria Ball, Ann Ewing, Faye Marley, Vincent Marteka, Jane Marye, Tove Neville, Marjorie Van de Water, Judy Viarst, Burrell Wood. Science Youth Division: Joseph H. Kraus, Dorothy Schriver, Leslie Watkins. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelson. Syndicate Sales: Hallie Jenkins. Librarian: Margit Friedrich. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, MEtropolitan 8-2562.

SPACE

Track World Weather

➤ NEWS ABOUT the world's weather could be gathered by a weather satellite system and broadcast to all parts of the earth by communication satellites.

Such weather information on an international scale would be of great value to all the peoples of the world in warning of severe storms and other weather changes, Dr. Harry Wexler, the U. S. Weather Bureau's director of meteorological research, said.

A beginning of this type of weather service has been made—weather satellite information from TIROS II has been sent by word message to the International Antarctic Analysis Center at Melbourne, Australia. There meteorologists from several nations are studying the weather patterns of large portions of the Southern Hemisphere.

A system of satellites of two types would be ideal for charting the world's weather. One system would circle the earth over the poles, the other would circle around the equator, Dr. Wexler told the First National Conference on Peaceful Uses of Space in Tulsa, Okla.

He said both types of satellites could send their observations into a central weather office. They could also pick up and transmit information from automatic weather stations located in uninhabited areas.

The hundreds of "small" weather cells 40 to 50 miles across, some of which develop into hurricanes, could be tracked by weather satellites, Dr. Wexler said. If such hurricanes were detected in their early stages, the next steps would be to prevent their further growth and possibly divert them so they would not hit populated areas. To do this, more knowledge of hurricane formation is necessary.

No one now knows why any one of the hundreds of thunderstorms turn into twisting tornadoes. Evidence from photographs taken by TIROS I indicates that the "mother" cloud of the tornado could possibly be picked from among the other clouds. Satellites might help in detecting the tornado-producing clouds, Dr. Wexler said.

He noted that world weather observations now cover only one-fifth of the earth's atmosphere.

• Science News Letter, 79:357 June 10, 1961

Man Can Beat Machines

➤ MEN WILL BE more effective than machines in space travel to the moon and planets.

An interplanetary rocket could not be controlled very precisely from earth because it takes information five to 15 minutes to travel over the immense distances. Men on the spot in the space vehicle would do a superior job, Dr. Lloyd V. Berkner, chairman of the National Academy of Sciences' Space Science Board, said.

One solution to the difficulties of designing radio and electronic systems for sending information back automatically would be to land a machine from the space vehicle on another planet where it could "write" down the information about the planet in a reduced form and send it back to earth. However, Dr. Berkner said he doubts that equipment will reach this level of sophistication in the near future.

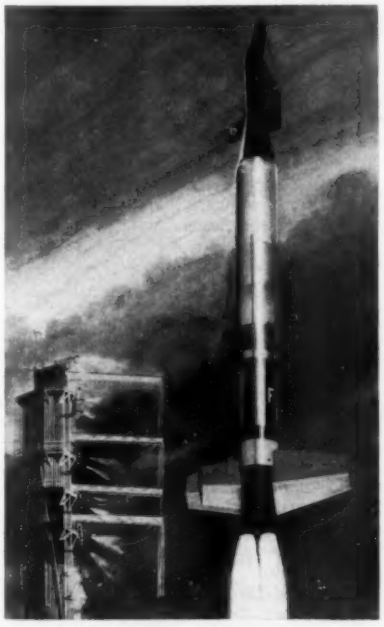
It is inconceivable that instruments can be designed to evaluate the many different things that can be explored in space by man's superior "computer brain," he told the First National Conference on Peaceful Uses of Space in Tulsa, Okla.

However, he said the competition between man and the machine in space is a "rough one." He predicted it will be a long time before man can be equipped to do jobs that several hundred tons of instruments cannot do.

This country leads in scientific knowledge gained from its satellite program, Dr. Berkner said. He cited as an example the information from Pioneer V, which holds the communications distance record of 20,000,000 miles. Pioneer V is also credited with the discovery of the third ring current surrounding the earth at 40,000 miles. It also measured and gave important information about radiation from the sun.

In meteorology the televised pictures of the earth and its cloud cover has had "revolutionary impact" on understanding weather, Dr. Berkner said. In another year the Nimbus satellite will map the earth's cloud cover and heat balance.

• Science News Letter, 79:357 June 10, 1961



SPACE GLIDER — The U. S. Air Force space glider, Dyna Soar, will be boosted into orbit by a modified Titan II rocket powered by the inorganic liquid fuel, anhydrous hydrazine, being produced by Olin Mathieson Chemical Corporation, Saltville, Va.

One Stage Space Vehicle

➤ A WINGED space vehicle that could fly from the ground into space in one stage and be recovered may be developed by the early 1970's.

J. R. Dempsey, vice president of Convair Division, General Dynamics Corporation, San Diego, Calif., said Convair is developing such a "single-stage-to-orbit" concept, and plans to adapt the system to its crew and to train such a crew to operate in the new type vehicle.

He told the First Conference on Peaceful Uses of Space in Tulsa, Okla., that the crew member of this model would not just be riding in the vehicle but actually control it at horizontal take-off from a runway. He would probably use automatic controls for the flight into orbit. Later he could again take control of the ship in flight as well as for recovery and landing.

Today's fast boosters cannot be manually controlled at take-off because man is not able to react fast enough. Boosters for space vehicles would become ineffective in performance if they were to be slowed down so man could control them.

• Science News Letter, 79:357 June 10, 1961

SPACE

Repeater Satellite for World Communications

➤ A REPEATER satellite to relay telephone, telegraph and television communications across the oceans is now a step closer.

The National Aeronautics and Space Administration announced that the Radio Corporation of America has been selected from seven firms to negotiate the construction of such an experimental satellite.

The Goddard Space Flight Center, the NASA installation responsible for communication satellite programs, will negotiate and manage the contract, which will cost about $3,250,000.

The repeater satellite is planned to weigh about 100 pounds and is to be placed in an orbit 3,000 miles from earth.

• Science News Letter, 79:357 June 10, 1961

SPACE

Star Field Tracker For Space Guidance

See Front Cover

➤ A LIGHTWEIGHT simple instrument for navigating a spacecraft has been developed by The Martin Company, Baltimore, Md.

The instrument, seen on the cover of this week's SCIENCE NEWS LETTER, stabilizes the spacecraft and can guide it to an accurate landing on the surface of the moon.

• Science News Letter, 79:357 June 10, 1961

EDUCATION

Academy Under Fire

➤ THE BILL to establish a science academy, for science training, like West Point or Annapolis, now the subject of hearings before a subcommittee of the House Committee on Science and Astronautics, continues to draw nation-wide fire from leading scientists and educators.

Dr. Alan T. Waterman, director of the National Science Foundation, reports widespread belief that "the expense and effort to create such an institution would definitely outweigh its desirability."

The bill sponsored by Rep. Victor L. Anfuso (D.-N.Y.) calls for an academy and research institutes, patterned along the lines of U. S. service academies. Both undergraduate and post-graduate training would be offered in science or engineering. After completing training, the student would be committed to a set period of Government career service. Qualified trainees would be in the 17-to-25 age bracket.

Rep. Anfuso said foreign students, if not classed as security risks, would also study at the academy, which would "draw talent from all over the free world."

Dr. Waterman has cited some objections to the academy concept.

Students best qualified would probably be able to attend other colleges and universities, and would not apply for academy admission if they wanted to avoid Government service, he said. This raises serious doubts as to whether the academy provides a basis for developing a competent Federal scientific service.

The academy may be less desirable than steps to strengthen "the many excellent, existing institutions of higher education."

The staffing problem is important. The supply of persons "competent to provide high quality teaching and research services" is limited.

First priority for appropriated funds, Dr. Waterman believes, should go to improving "highly obsolescent" instructional and research facilities at established schools.

Dr. Thomas H. Carroll, president of George Washington University, Washington, D. C., told the subcommittee he was "not too greatly impressed with the need for a new academy to establish nation-wide standards" for scientific training. He also believes first emphasis should be on building up "the resources of our present institutions."

Rep. Anfuso said the subcommittee is "prepared to make changes (in the bill) to overcome some of the objections raised by colleges and universities."

The mounting wave of opposition parallels results of a SCIENCE SERVICE Grand Jury poll, conducted in 1959. Heads of leading American scientific societies were almost unanimously against the idea of a Federally supported academy for science training. The vote was 95% "no" and only 5% "yes."

• Science News Letter, 79:358 June 10, 1961

EDUCATION

Thinking Is School Goal

➤ UNITED STATES SCHOOLS need to focus on developing the ability to think as the central purpose of teaching efforts, the Educational Policies Commission said.

The 19-member independent deliberative body, composed of outstanding educators, issued a statement citing "the development of rational powers supported by substantive knowledge" as the key to strengthening all other educational purposes and better achievement of all traditional school obligations.

They compared human rational powers to "the hub of a wheel," stressing that persons with such powers can live to the fullest.

"And the society which best develops the rational potentials of its people, along with their intuitive and aesthetic capabilities, will have the best chance of flourishing in the future," the Commission said.

Commission members said studies of "an abstract subject like mathematics or philosophy" do not necessarily add to reasoning powers. The ability to analyze, deduce or infer may come from work in "aesthetic, humanistic and practical fields, which also involve perception of form and design," as well as from mathematics studies.

"Music, for example, challenges the listener to perceive elements of form within the abstract. Similarly, vocational subjects may engage the rational powers of pupils."

The Commission urged extended research on learning processes, aimed at "constantly higher levels of aspiration and attainment" for everyone.

"There is no upper limit to human ability, and much of what people are capable of doing with their minds is probably unknown today," they said.

Members rejected "the idea that a few should be educated and that the majority should be trained." All pupils, they said, "have latent, unrealized powers of creativity." They called for an educational program "suffused with creativeness and innovation," rather than "a narrow and exclusive intellectualism."

They said pupils who develop the ability to think and "learn to apply it to all the problems that face them" will have a solid basis for competence in other traditional school areas—development of good mental and physical health, worthy home membership, vocational competence, effective citizenship, intelligent use of leisure time, and development of ethical character.

Copies of the Commission report, "The Central Purpose of American Education," are available at 35 cents each from the National Education Association, 1201 16th Street, N.W., Washington 6, D. C. Dr. Benjamin C. Willis, general superintendent of Chicago schools, heads the Commission.

• Science News Letter, 79:358 June 10, 1961

EDUCATION

NSF Director Sees Need For More College Grants

➤ MORE GOVERNMENT GRANTS to educational institutions and graduate research laboratories are needed to slow the "drain on universities" by private industry hiring top scientific and engineering talent, Dr. Alan T. Waterman, director of the National Science Foundation, believes.

Industry, using its own and Government funds, frequently offers "greater opportunities, higher salaries and better equipment," he said. University salaries "have not gone up fast enough to provide a competing situation."

Testifying before the House Committee on Science and Astronautics in its annual review of NSF activities, Dr. Waterman said more funds also are needed for "adequate salaries and equipment" at the Government's own research laboratories. "Otherwise the caliber goes down," he said.

Dr. Waterman said "plenty of people are going into nuclear physics" at colleges and universities—enough student talent to meet known demands, he believes. He said institutions also are trying to meet the need for astronautical engineers by "attempting to start departments, or at least adding a series of courses."

Answering a question by Rep. Joseph E. Karth (D.-Minn.), Dr. Waterman said he personally thought an 11-month school year, instead of the traditional nine months, was "a very logical system" for stepping up America's educational progress. But he said it was not NSF's responsibility to recommend it.

Main objections, he said, would stem from "inertia toward radical change" and the question of what to do about students who depend on summer employment for money.

• Science News Letter, 79:358 June 10, 1961

VITAL STATISTICS

Farmers' Average Age Is Now 50.5 Years

➤ THE AVERAGE AGE for American farmers has been creeping slowly toward the 65-and-over mark for 50 years so that today the average age is 50.5 years and 16.7% of all farmers are 65 or older.

The increasing age of farmers in general is causing concern to the Federal Government, a House appropriations subcommittee report said, because many farmers are employed only part of the year, and the older they are the less eager they are to relocate where there is more work.

The state with the oldest farmers is West Virginia, where the average age is 54.4 and one-fourth are 65 or over. At the other extreme is Alaska, where the average is 46 years and only 8.2% are 65 or over.

• Science News Letter, 79:358 June 10, 1961

BIOLOGY

To Probe Pigeon Mystery

➤ THE ANCIENT MYSTERY of how homing pigeons manage to navigate over unfamiliar territory and find their way back to the home loft has attracted Navy interest.

The Office of Naval Research is using a new system that makes it possible, for the first time, to track a pigeon during the entire flight. There are hopes that the work, which is part of a research program in biological orientation, will lead to new concepts for developing miniaturized navigation and detection systems.

The equipment got its first trial when a pigeon was tracked during a 20-mile jaunt to its home in the Philadelphia area. It carried a tiny but powerful radio transmitter, weighing less than an ounce, on its back. Attached to the transmitter was a 40-inch antenna, trailing behind and below the bird, and partially encased in a glass fiber rod to keep it from tangling with tail feathers.

A beacon receiver designed to operate with the transmitter can pick up the signal from any direction over a 20-mile range. Two receiving stations were set up along the probable flight path to record directional information at exact, predetermined time intervals.

The transmitter permits trackers to pinpoint the bird's location at any time, although the exact path is normally plotted after the flight.

Later, a more complex system of sensory devices may be built to monitor environmental changes and the bird's reaction to them, measuring such items as blood pressure and respiration.

The Navy scientists' next projected move is the tracking of larger birds—notably the gooney bird, or albatross. They want to find out ways to get the birds to move away from airfields such as the one at Midway Island, where they frequently endanger aircraft during take-offs and landings.

American Electronic Laboratories, Philadelphia, developed the system for the Navy. The same firm is now working on a tracking system for aquatic animals—such as porpoises, whales, sharks and marine turtles—which come close enough to the surface to permit the instrument package to transmit.

• Science News Letter, 79:359 June 10, 1961

BIOCHEMISTRY

Best Anesthetic Predicted

➤ THE BEST anesthetics will be mixtures of compounds whose molecules are of such size and shape as to fit in holes in networks of 20, 24 and 28 water molecules, Dr. Linus Pauling, Nobelist in chemistry, California Institute of Technology, told SCIENCE SERVICE.

Dr. Pauling's new theory on the action of anesthetics enables him to describe the chemical substances that will act best as anesthetics.

Dr. Pauling has linked the action of anesthetics with the formation of compounds in which molecules of one substance are trapped in a network of molecules of another substance, such as water. These unusual compounds are called clathrate compounds. Water forms traps that look somewhat like the cells in a honeycomb except they are five-sided instead of six-sided.

The molecules of anesthetics fit into the holes of water lattice structures containing 20, 24 or 28 molecules of water. The clathrate compounds thus formed are very small crystals that cause unconsciousness when they occur in the brain fluid.

Chloroform forms a hydrate microcrystal that contains 17 molecules of water per molecule of chloroform. If a mixture of xenon, a rare inert gas, and chloroform is used, the clathrate compound contains two molecules of xenon in addition to the 17 molecules of water per molecule of chloroform. This new clathrate is more stable than the one without xenon. For this reason it should be more effective.

Mixtures of two or more compounds such as carbon tetrafluoride, carbon bromide trifluoride, carbon fluoride trichloride and fluothane with xenon should produce very stable clathrate crystal.

The patient would breathe the mixture of gases, which would then pass through the blood to the brain fluids where the small crystals would form.

Dr. Pauling believes that consciousness requires a constant interchange of electrical energy in the brain. The presence of microcrystals in the brain interferes with the passage of electric currents from one brain cell to another causing unconsciousness.

This new approach to understanding unconsciousness should shed light on many mental problems. It may lead to the development of methods of restoring consciousness to persons subject to prolonged periods of unconsciousness.

• Science News Letter, 79:359 June 10, 1961

BIOLOGY

World Biological Year Proposed by Scientists

➤ AN INTERNATIONAL Biological Project, similar to the International Geophysical Year, has been proposed and is receiving active support from top scientists and scientific organizations throughout the country.

In the first public discussion of the Project, Dr. Hiden T. Cox, executive director of the American Institute of Biological Sciences, said such a plan is now under active consideration.

Between five and seven years of preparation and arrangements would be necessary and the project itself would have to run longer than International Geophysical Year, which lasted 18 months.

The main aim of the project would be the marshalling of scientific forces for a massive attack on such world problems as population control, food, farming of the oceans and the polar areas, cancer and radiation.

Speaking on a local radio program in in Washington, D. C., Dr. Roger D. Reid, Office of Naval Research, said that "we can no longer afford the luxury of leaving biological research to the chance that someone may come up with an essential bit of information. We must define our problems and make a concerted effort to find answers."

• Science News Letter, 79:359 June 10, 1961

VETERINARY MEDICINE

New Drug Controls Worms in Cattle

➤ A VETERINARY drug reported to control any and all of the intestinal worms that attack cattle and sheep has been developed by British scientists and is now being field tested in the United States and Canada.

If the tests are successful, the drug, called Promintic, probably will be available in the United States before the end of the year.

The drug already has been tested on 1,000 cattle and 3,000 sheep in Britain. When injected under the skin, it destroyed the parasites at all stages of growth, thus reducing the probability of reinfestation from later growth of immature worms.

• Science News Letter, 79:359 June 10, 1961

CATTLE GRUB KILLER—A chemical for killing cattle grubs is ladled on the back of an Aberdeen Angus bull at the University of California, Riverside, where this new method for killing the pests was developed. The chemical penetrates the body of the bull and kills the grubs before they can damage the hide of the animal.

ARCHAEOLOGY

Moving of Stonehenge Stones Explained

➤ A NEW SOLUTION to the problem of how the huge boulders were transported and set up in circles at the celebrated religious monument at Stonehenge, England, has been suggested.

The outcrops of the so-called sarsen stones of Stonehenge that are nearest to Stonehenge are some 21 miles away, but a probable route mapped out by Dr. Patrick Arthur Hill of Carleton University, Ottawa, Canada, is "essentially downhill" for 17 of its 21 miles.

Some of the sarsen stones weigh as much as 50 tons and at the time they were moved into place, in the early Bronze age about 1500 B.C., there were supposedly no wheels in Britain, no beasts of burden and, other than rawhide, no rope.

If the climate of Britain in 1500 B.C. was somewhat colder than it is today, the great stone blocks might have been dragged to Stonehenge on sledges over ice, packed snow or even slush, Dr. Hill suggests in Science, 133:1216, 1961. The best surface for heavy-duty transportation would be "ice roads" made from snow packed by the repeated passage of sledges or by the spraying or spilling of water. Such roads have been used in northern Europe and North America for centuries.

• Science News Letter, 79:360 June 10, 1961

MEDICINE

Surgery Still Best For Curing Cancer

➤ SURGERY remains paramount as the method of curing cancer in spite of advances in the use of drugs and radiation, Dr. Irving M. Ariel of the New York Medical College told the International College of Surgeons North American Federation meeting in Chicago. But radical surgery should be "rational."

Some 3,000 surgeons from 16 countries heard Dr. Ariel evaluate the super-radical operations that have been done in the past 15 years.

"For many years three routine operations were performed," he said. "These were radical mastectomy (breast removal), hysterectomy (removal of the uterus) and resection (or removal) of rectal cancer.

"In the mid-forties improved surgical care and antibiotics made possible resection of any part of the body, from a technical standpoint, but some of the super-radical procedures should be abandoned."

Super-radical surgery for pancreatic cancer that has spread to some structures has shown such poor results that it should be given up, the surgeon said.

Once the surgery and other specific anti-cancer treatments have been carried out, the remainder of the management of the patient is in the psychological field, Dr. Edward M. Litin, consultant, section of psychiatry, Mayo Clinic, Rochester, Minn., said.

"If we are ever to negate the notion that a diagnosis of cancer is equivalent to death, which is far from true in a significant number of cases," Dr. Litin advised, "we must stop acting like it ourselves and discuss cancer freely and honestly, but always hopefully with our patients."

Dr. Litin advised regular visits to show a continuing interest and to guard against the onset of depression. Physicians are often amazed at the way patients adapt to the knowledge that they have cancer, he said.

• Science News Letter, 79:360 June 10, 1961

PSYCHIATRY

"Chronic Helpfulness" Impairs Treatment

➤ CHRONIC HELPFULNESS on the part of a mental patient, although it is welcomed by the hospital staff because such patients make valuable workers in the ward, has been found to interfere with the patient's treatment.

The American Psychiatric Association meeting in Chicago learned this from a report by Sheila Rouslin, a graduate fellow at Rutgers University, New Brunswick, N. J.

"Chronic helpfulness," Miss Rouslin explained, is not to be confused with spontaneous assistance that is prompted by a patient's wanting to do something for others. "Chronic helpfulness" is prompted by a feeling of compulsion. When the compelled help is given, the patient feels no satisfaction but instead has a feeling of being used.

When the patient contributes his work because he is driven by chronic helpfulness, the work is accepted by the staff as helping the treatment of the patient and because the hospital also has a manpower problem.

Actually this kind of work helps neither the patient nor the hospital. The patient is not helped because staff encouragement of the compulsion to work interferes with treatment. The hospital is not helped because the patient remains in the hospital, thereby increasing the hospital's financial burden.

• Science News Letter, 79:360 June 10, 1961

SPACE

Venus Rocket Thrust Exceeds U. S. Five Times

➤ THE RUSSIAN Venus rocket probe launched Feb. 12 probably developed a thrust five times greater than the present best efforts of the United States in the same field.

A five-stage rocket, originally weighing 800 tons, lifted off the launching pad in the Venus shot, Dr. Jozsef Sinka, Hungarian space scientist, reports in a translation by the U. S. Joint Publications Research Service in Washington, D. C. The first three stages sent the probe into orbit.

The rocket thrust was probably around 2,000,000 pounds, much greater than the United States most powerful rocket, the 360,000-pound thrust Atlas. The Saturn currently being developed has a 1,500,000-pound thrust, but it will not be used for a probe until at least 1964.

• Science News Letter, 79:360 June 10, 1961

IN SCIENCE

GEOPHYSICS

Moon and Sun Gravity Affects Earth's Crust

➤ THE STRONG SOLAR and lunar gravitational pull affects the regions of the earth's crust responsible for the development of pressures that build or tear down mountain ranges throughout geologic history, Dr. F. P. Belyankin of the Ukranian Soviet Socialist Republic Academy of Sciences has found.

Scientists will soon be able to predict how the earth's crust will look in the future as well as in the past, the Russian scientist states in a translation by the U. S. Joint Publications Research Service in Washington, D. C.

The stresses and strains triggered in the earth's crust by the gravitational pull are highly complex, varying from region to region. Towering mountain ranges and great deserts react differently under this constant pull, the scientist noted, creating their own processes that trigger earthquakes, erode mountains or fracture rocks.

This attraction by the moon and sun also creates the well known earth "tides" or bulges in the earth's crust. The crust, which is about twice as rigid as steel, actually rises and falls a few inches in a manner similar to the ocean tides.

• Science News Letter, 79:360 June 10, 1961

SPACE

Echo Problem Haunts Space Age Satellites

➤ AN ECHO PROBLEM in radio communications that was solved nearly 40 years ago has bounced back to haunt space age communications satellites.

Future satellite communication systems relaying two-way telephone conversations across the oceans and continents will be hampered by an echo caused when a voice travels to its destination and back to the person speaking.

This problem, which was solved on the ground as early as 1922, will force speakers to talk at a slower rate, stutter or stop all conversation, R. P. Haviland and A. J. Vadasz of General Electric Company told a symposium on global communications in Chicago.

Satellites whirling around the earth at a 6,000-mile altitude would lessen, though not eliminate, the echoes, the scientists said.

Although "fewer satellites are needed for relay purposes when the orbit is at higher altitudes," the echoes would greatly increase because of the greater distances, and create confusion, they reported.

About ten satellites would be needed to lessen the echo effect, the scientists concluded.

• Science News Letter, 79:360 June 10, 1961

NE FIELDS

MEDICINE

Air Pollution Blamed For Chronic Lung Disease

➤ CHRONIC LUNG DISEASE and air pollution are linked by enough circumstantial evidence to start control programs now, a U. S. Public Health Service official reported.

Vernon G. MacKenzie, chief of the division of air pollution, demanded action to clear the air of such pollutants as wastes and smoke from industry, exhausts from motor vehicles, incinerators improperly run, coal furnaces incorrectly operated, and the burning of debris or leaves in yards of homes.

Techniques available to control most types of air pollution are not being used, Mr. MacKenzie told a public health session of the National Tuberculosis Association meeting in Cincinnati, Ohio.

The country should not wait for positive proof of the relationship between impure air and chronic lung disease, the speaker said. Effective control programs should be started "just as our forebears did a hundred years ago on the basis of circumstantial evidence linking filth and intestinal communicable diseases."

Only 106 communities of 6,000 needing control programs are doing anything effective, Mr. MacKenzie said. Of the city population, 90% live in localities with air pollution problems.

The Federal Government should give vigorous leadership in expanding research on the causes, effects and control of air pollution, he recommended. It also should assist states and communities in developing programs and in calling their attention to the problem, he said.

• Science News Letter, 79:361 June 10, 1961

MEDICINE

Balloon Used in Stomach To Photograph Cancer

➤ BALLOON PICTURES taken inside the stomach can reveal whether or not a patient has cancer.

A total of 352 patients with stomach complaints swallowed small deflated balloons after swallowing or getting injections of radioactive phosphorus. The balloons are coated on the inside with a light-sensitive emulsion, making it virtually a photographic film.

The balloon is inflated in the stomach and left there for four hours, when it is deflated and removed.

Cancer takes up more phosphorus than does healthy stomach tissue adjacent. The radioactive phosphorus concentrated in the cancer produces a dark spot on the film on long exposure within the stomach.

The American Cancer Society, which helps to support this research under the direction of Dr. Owen H. Wangensteen, of the University of Minnesota Hospitals in Minneapolis, reported that other measures devised by surgeons working with him were also helping some patients with internal cancer.

Radioactive dyes have been given to patients by the surgeons, who with the help of a scanning system have ferreted out hidden cancer colonies in the liver. Radioactive iron also has been given to detect digestive tract bleeding.

Since 1949 the Wangensteen group has been taking a "second look" at operated areas within cancer patients. From four to nine months following the original operations, they have opened up the patient and searched for evidence of cancer.

In one-half of the patients there was no sign of recurrence, but in the other 50% cancer colonies had come to life. One patient had seven "looks" in four and a half years, but on the seventh, he was declared cancer free.

• Science News Letter, 79:361 June 10, 1961

PUBLIC SAFETY

Drownings in Bathtubs Swell Accident Toll

➤ MORE THAN TWICE as many persons drown in bathtubs as in swimming pools or in other water on home grounds, the National Office of Vital Statistics, U. S. Public Health Service, Washington, D. C., reports.

The most recent annual report (1958) shows that 140 children and adults drowned in bathtubs, whereas 62 met death in swimming pools, 57 in cisterns, wells or cesspools. A total of 407 home drownings included those in other bodies of open water, and miscellaneous specified and unspecified places.

Warren W. Morse, analytical statistician, said about three-fifths of those who died were less than five years old and that half were no more than two years old. In every eight drownings, one person was five to 19 years old and one was 20 to 44 years old.

Swimming pools are more likely to be protected from small children, which accounts for the fact that only 39% of those who died in swimming pools were under five years of age.

Among unexpected types of drowning at home, were one of a ten-month-old child in a five-gallon bucket and those of one-year-olds in a five-gallon can, a bucket and a 20-gallon crock.

The statistician pointed out that 55% of 96 persons 20 years old or over, drowned in bathtubs, 25% in swimming pools and 20% in wells, cisterns and cesspools.

Among other open bodies of water around home that caused deaths by drowning were a lake, a creek, a hole filled with water, four ditches and five fishponds.

Deaths from accidental drownings in the United States during 1958 totaled 5,605, almost 11% of the 47,300 deaths from all nontransport accidents. The statistics are published in Public Health Reports, 76:452, 1961.

• Science News Letter, 79:361 June 10, 1961

PSYCHIATRY

Phone Suicide Warnings Are Calls for Help

➤ EVEN THE MOST desperate person contemplating suicide is usually willing and even anxious to receive help in preventing his contemplated act.

This was found by the Suicide Prevention Center of Los Angeles in handling the large volume of telephone calls warning of impending suicides. Marvin N. Kaphan, psychiatric social worker, and Dr. Robert E. Litman, psychiatrist-director of the Center, reported how the Center operates to the American Psychiatric Association meeting in Chicago.

As the calls come in, they are taken by the psychiatric social worker. In this the psychiatric social worker has the close collaboration of a psychiatrist. An unusual degree of initiative and responsibility is, however, required of the social worker. Of all psychiatric emergencies, the suicidal crisis is the gravest, the Suicide Prevention Center workers said.

Simultaneously and swiftly, the social worker at the telephone must give the caller support until help can arrive. A rapid evaluation of the psychiatric condition of the person threatening suicide must be made. Information on the social situation must be obtained.

Out of the experience at the Center, guides have been evolved for evaluation of the suicide risk. These include a brief schedule of critical information and a group of psycho-social patterns about which the person handling the emergency needs data.

The report was made as an aid to the general practitioner who sometimes must handle such emergency telephone calls, the investigators said. Calls may come from the person contemplating suicide, from a relative, or from some other interested person.

• Science News Letter, 79:361 June 10, 1961

ASTRONOMY

Supernova Found In Southern Sky

➤ A SUPERNOVA, a star that suddenly explodes to many million times its original brightness, has been discovered in the constellation Virgo, which is visible in the southern sky at about 9:00 p.m. EST.

The supernova is too faint (11th magnitude) to be seen without a telescope six inches or larger. It belongs to a galaxy (star system) very distant from the Milky Way galaxy in which the sun and its planets are located.

Supernovae occur only once every several hundred years in each galaxy. They can be observed from earth several times a year since they occur in various galaxies.

The newly discovered supernova, located in the galaxy called NGC 4564 is of spectral type one, which means it will fade rapidly, it was reported to Harvard College Observatory, Cambridge, Mass. The supernova was discovered at the Astronomical Observatory in Padua, Italy, on May 9.

• Science News Letter, 79:361 June 10, 1961

SPACE

Space Hops Are Research

The testing of boosters, vehicles and men in space is scientific research essential as preparation for travel to the moon and planets, Tove Neville reports.

➤ SENDING a U.S. astronaut into space is not just a spectacular stunt for prestige or propaganda purposes, it is research.

It may also be a question of United States survival. A House space committee has warned that control of earth may depend on power in outer space.

Space research consists in testing men and space vehicles until the quality of the vehicle, its systems and man's ability to handle them in space have been proved beyond reasonable doubt.

However, astronauts to follow the first U.S. space man, Cmdr. Alan B. Shepard Jr., are likely to carry out far more complicated tasks than he did.

The next astronaut, expected to take off after June 20, may control his capsule by looking out of a window. Horizon lines located on the window of the Mercury capsule in which the astronaut rides can be lined up with the real horizon the astronaut sees through the window. As he maneuvers the capsule, he can line up the lines on the window with the horizon according to the desired position.

This task will require close coordination of hand and eye by the operator under weightless conditions. Can he do it? Astronaut Shepard did not perform this task on his 15-minute trip. He controlled the capsule solely with instruments.

Maneuvered Capsule

Cmdr. Shepard made his capsule pitch (nose up or down), roll (spin like a top) and yaw (move from side to side) with his instruments. The next astronaut could be given the task to pitch, roll and yaw his capsule many more times than Cmdr. Shepard was instructed to and at different speeds, the National Aeronautics and Space Administration said.

Other important tasks of future astronauts are observations of cloud cover and studies of the horizon itself.

Cloud cover seen from space would be important in weather observations since the types of clouds observed could be correlated with the weather under the clouds.

By studying the horizon the astronaut might be able to determine directly how the atmosphere refracts light and what colors are dominant. Astronaut Shepard already determined that colors can be seen from space.

Cmdr. Shepard worked 127 controls to test his coordination in space while weightless and afterwards on his way back to earth. While performing these tasks, he changed his communications frequency and the environment, such as temperature, in his cabin. He also controlled the retro-rockets as a back-up for the control center and at times checked with a receiver the systems on board the capsule. Whenever he got a green light from the ground, he also reported back to earth.

The space agency said the maximum information that could be expected was obtained from astronaut Shepard's 302-mile long flight, which was considered near perfect. The information from the first flight may be so complete that the predicted number of four suborbital flights can be cut down before the orbital flight around the earth is attempted.

An unmanned Mercury capsule, which failed to orbit on April 25, will also be given another whirl. At the time of the first shot when the Atlas missile misfired, the safety mechanism worked perfectly and released the capsule that was recovered from the water as it would be after a normal flight.

All suborbital shots are scheduled to be fired with Redstone rockets, as was astronaut Shepard's, whereas the orbital flights of the Mercury capsule will be boosted by the larger Atlas missile. A chimp will take the trip around the earth before man does.

The first manned shot will circle the earth three times and test man and capsule for about four and a half hours. Previous suborbital flights will have trained the astronaut for survival if any of the systems fail.

One of the prime purposes of the orbital flight is to study the effects of weightlessness on man during this long period of time. The Mercury capsule will return from the flight in a two-parachute fall similar to those of suborbital flights. The Apollo capsule, scheduled to orbit the earth with three men in 1965, if Congress votes a budget for an accelerated program, will use the same recovery approach.

Testing Mercury and Apollo

It is hoped that Mercury capsules will eventually make trips of up to 18 orbits each during the next two years. Testing of Mercury and Apollo capsules will probably overlap. The Apollo will be carried aloft by the Saturn booster, a six-cluster rocket with a thrust of 1,500,000 pounds, compared to the Atlas with 360,000 pounds of thrust and the Redstone with only 78,000 pounds.

The Apollo-Saturn combination is planned to send men for a week's trip around the moon. This could be achieved under a high-powered program between 1967 and 1969.

An actual moon landing is feasible by 1970, the space agency reported. The F-1 liquid-fuel rocket for the booster is now completed and ready for testing, but design

READY FOR FLIGHT—Astronaut Alan B. Shepard Jr. peers out of the Mercury space capsule that took him 115 miles up for the first U.S. suborbital space flight.

for the rocket and the space vehicle is still in the study stage. The next step: the planets.

Space research is pursued by scientists not for control of earth or space, or even for defense. Man has always been breaking new frontiers, always tried to overcome his environment and conquer the unknown, or pioneered out of curiosity "to see what he could see."

One of the earliest records left today that express man's desire to fly and leave the earth is the story from Greek mythology of Daedalus, an ingenious Athenian artist who made wings with feathers and wax for himself and his son Icarus to escape from Crete where he was held prisoner.

Man has always wanted to fly and often in tale and poetry envied the flight of the bird that has become symbolic for freedom. Many attempts at flying were made in man's early history, and in the 15th century Leonardo da Vinci, the Renaissance genius, even designed flying models and invented the propeller.

The first man-carrying free balloon ascension took place in 1783. This was followed by the first successful parachute jump in 1797. In 1810 came the first successful man-carrying glider. Steam-powered experimental planes and airships with internal combustion engine power, glider flights and analysis of the principles of flight were made during the rest of the 19th century.

Between 1898 and 1910 Alberto Santos Dumont built successful airships and airplanes which he flew himself. On Dec. 17, 1903, the famous flight was made by the Wright brothers, Wilbur and Orville, in their internal combustion engine biplane. This flight is generally accepted as the first successful flight of a powered aircraft.

Now, less than six decades later, two men within a month of each other have flown into outer space. On April 12, the Russian Yuri Gagarin circled the earth in 89.1 minutes, the USSR reported. On May 5, the first U.S. astronaut flew 115 miles into space on a down-range trip from Cape Canaveral to a spot near the Great Bahama Island.

• Science News Letter, 79:362 June 10, 1961

SPACE

Russians' Space Schedule

➤ RUSSIA'S SPACE SCHEDULE in 1961 calls for at least two more manned space flights—one to circle the earth, the other, perhaps, to the moon.

In 1962, the Soviets are planning to set up on the moon one or two automatic stations that will send back information on temperature, landing and other conditions. If both the manned observation flight and the instrumented station landings are successful, the USSR will then try to place a man on the moon.

The predictions come from Dr. Grigori Aleksandrovich Tokaty, former chief scientist and deputy head of the USSR Long Range Rocket Group, who was responsible for much of the early Soviet rocket development before leaving the USSR in 1949 for ideological reasons.

Dr. Tokaty has been in this country for the past month as visiting lecturer in engineering at the University of California, Los Angeles, and consultant on American space problems. He is now a British citizen and heads the department of aero space engineering at Northhampton College of Advanced Technology, London.

The current space race between the Soviet Union and the United States is only a warm-up for the real competition, which will start in five to seven years when both countries will try to place permanent space stations in orbit, Dr. Tokaty predicts.

Soviet engineers and scientists have been working intensively on this project for the last few years. Their plans, Dr. Tokaty reports, call for the orbiting of a 10- to 12-ton instrumented satellite, which will be joined by a second, manned vehicle. Rockets will send up additional instruments and materials, allowing the 10- to 15-man crew to construct an elaborate and practically permanent space station.

Dr. Tokaty attributes the success of the Soviets' space effort to complete centralization of all programs under one ministry, thorough theoretical proof for all projects before any experiments are started, and Russia's traditional excellence in mathematics and long history of rocket studies.

• Science News Letter, 79:363 June 10, 1961

SPACE

USSR Sent Cloud Pictures From U. S. Tiros Satellite

➤ CLOUD PICTURES over the Soviet Union taken by the United States weather satellite Tiros have been sent to the Russians by the National Aeronautics and Space Administration. A polite note of thanks was received in return.

Future U. S. space efforts will include an ionosphere satellite launched jointly with the United Kingdom and an extensive program of scientific sounding rockets with more than a dozen Western allies.

The sounding rockets explore an area from 20 to 100 miles above the earth. NASA scientists have found for the first time evidence that heavy nuclei occur in the nitrogen region high in the earth's atmosphere. These heavy nuclei are believed to be released by the sun.

Another recent probe showed a distribution of energy in the Van Allen belts different than had been expected. The significance of this discovery is tied to the origin of the Van Allen belts.

NASA scientists at Greenbelt, Md., hope to extend the sounding rocket program to a global scale. But officials would not say whether they expect USSR participation in this program in the near future.

• Science News Letter, 79:363 June 10, 1961

SMALL MAGNET PULLS 150 LBS.

This amazing "Alnico V" reader Magnetron supplies lifetime, non-electric power for many uses by industry, craftsmen, experimenters, boatmen, fishermen, hobbyists. Retrieves valuable tackle, tools, guns, motors, etc. from salt or fresh water, deep tanks, shafts, drains. (3 x 3¼ x 4 in./wt. 6 lbs.) Pulls 150 lbs. on steel block. Cost govt. $65. Only $12.75 ppd.

"E SERIES" ALNICO V RETRIEVER ASSEMBLY

E30 Pulls 30 lbs. (3 x 3 x 2½ in./wt. 38 oz.) $3.95
E75 Pulls 75 lbs. (3 x 3 x 1⅝ in./wt. 42 oz.) $4.95
E125 Pulls 125 lbs. (3 x 3 x 2⅛ in./wt. 68 oz.) $7.95

SPECIALS

M30 Hobbyist Assortment/12 valuable "odds & ends" small magnets $2.00
W35 Welder's Magnetic Positioner Block (2 x 2⅛ x 2⅛ in./wt. 2¼ lbs.) $3.75
S10 Ring Magnet (2" OD, 1" ID, 1⅛" L./wt. 1⅛ lbs.) $1.95
M30 Hot Pad, Bulletin Board, Multi-Purpose 1⅛ x ⅛ x ⅛ in.) ..... 10 for $1.00
C40 Self-Adjusting Magnetic Cabinet Door Latch ..... 3 for $1.00
P50 Pen-type, Handy Magnetic Pickup Tool ..... 3 for $1.00

Money Back Guarantee. We pay postage.

MAGNA MAGNETICS, 7777 Sunset Strip, Los Angeles 46, Calif., Dept. 5

SELF DEFENCE BY JUDO

by M. G. Harvey. An expert in the art of self-defence by the Japanese judo system of fast hand, arm, and foot maneuvers, illustrates and explains these techniques. Various holds, locks, and moves. 120 black and white drawings.

Self-teaching • Copiously illustrated
$2.50 Postfree • 10-day money-back guarantee

EMERSON BOOKS, Inc., Dept. 270-M
251 West 19 Street, New York 11

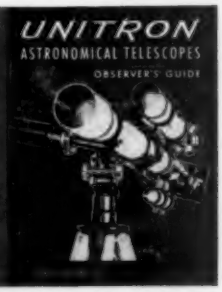
RADIOMETER

American made. Balanced four arm vane, in a 3" diameter evacuated glass globe, turns upon exposure to light, any light, even a lighted match. Highly decorative, interesting, educational, instructive. A conversation piece. We guarantee yours to operate.

$3.00 p.p. 2 for $5.00 p.p.

HARRY ROSS Scientific & Lab Apparatus
61-L Reade St., N.Y. 7, N.Y.

FREE 50 PAGE OBSERVER'S GUIDE



With artificial satellites already launched and space travel almost a reality, astronomy has become today's fastest growing hobby. Exploring the skies with a telescope is a relaxing diversion for father and son alike. UNITRON's handbook contains full-page illustrated articles on astronomy, observing, telescopes and accessories. It is of interest to both beginners and advanced amateurs.

CONTENTS INCLUDE:

Observing the sun, moon, planets and wonders of the sky • Constellation map • Hints for observers • Glossary of telescope terms • How to choose a telescope • Astrophotography

UNITRON
INSTRUMENT COMPANY • TELESCOPE SALES DIV.
66 NEEDHAM ST., NEWTON HIGHLANDS 61, MASS.

Please rush to me, FREE of charge, UNITRON'S OBSERVER'S GUIDE and TELESCOPE CATALOG # 5-Q-2

Name _____
Street _____
City _____ State _____

• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

ACTIVITIES IN EARTH SCIENCE: Laboratory Manual—Namowitz—*Van Nostrand*, 180 p., illus., paper, $2.20. To accompany EARTH SCIENCE, The World We Live In.

ADVANCES IN PSYCHOSOMATIC MEDICINE: Symposium of the Fourth European Conference on Psychosomatic Research—Arthur Jores and Hellmuth Freyberger, Eds.—*Brunner (Basic Bks.)*, 334 p., $8.50. Conference discussed methods and principles of research on psychosomatic fundamentals, and training for psychosomatic medicine.

ARMS REDUCTION: Program and Issues—David H. Frisch, Ed.—*Twentieth Century Fund*, 162 p., paper, $1.25. Series of papers discussing technical and strategic problems of specific arms control plans and systems.

ARTIFICIAL EARTH SATELLITES, Vols. 3, 4 and 5—L. V. Kurnosova, Ed., transl. from Russian—*Plenum Press*, 576 p., illus., $15. Translated Russian papers on technical topics, such as sodium vapor diffusion method, radio-frequency mass spectrometer, magnetometers in Sputnik III, and impacting of meteoric matter.

ARTIFICIAL SATELLITES—Michael W. Ovenden—*Penguin*, 128 p., photographs, illus. by Kenneth James, paper, $1.25. Short illustrated guide to rockets, satellites and space probes.

THE ASTRONAUTS: The True Story of Man's Greatest Adventure in Outer Space—Don Myrus—*Grosset*, 92 p., photographs, $1.95. For young people.

BASIC ELECTRICITY—U. S. Bureau of Naval Personnel—*GPO*, 448 p., illus., paper, $3.50. Navy training course in two parts, with both limited and broader coverage.

THE BASIC WRITINGS OF BERTRAND RUSSELL, 1903-1959—Robert E. Egner and Lester E. Denonn, Eds., preface by Bertrand Russell—*Simon & Schuster*, 736 p., $10. Wide selection of Nobelist's essays, writings on mathematics, education, science and international affairs, with chronology of life and works.

CAN SCIENCE SAVE US?—George A. Lundberg—*Longmans*, 2nd ed., 150 p., $2.75. Updated edition of sociologist's investigation of the application of the scientific method to problems of human and social relations.

CELL PHYSIOLOGY OF NEOPLASIA—Russell W. Cumley and others, Eds.—*Univ. of Texas Press*, 653 p., illus., $10.50. Papers presented at the Fourteenth Annual Symposium on Fundamental Cancer Research, discussing nucleus, cytoplasm, nucleic acids, and cell growth.

Largest Distributors of U.S. Govt. Surplus Balloons in the USA. Inflate up to Giant 30 ft. diameter with air or gas. Fun at the Beach, Water Sports, etc., Flying Advt. visible for miles. Terrific for attracting crowds at Openings, Fairs, Roadside Stands, Gas Stations, Sports Events. Made of Durable Neoprene Rubber. New, never used. No C.O.D.'s.

2 ft. (Beach Ball Size) . . 2 for 50c (5 for $1.00)
6 ft. size . . . . . 50c ea. (2 for $1.00)
10 ft. size . . . . . $1.00 ea. (6 for $5.00)
20 ft. size . $2.00 ea. plus 50c postage & handling
30 ft. size Illus. . . 10 for $20.00—Exp. collect

NOVEL MFG. CORP. 21 SECOND AVE., Dept. G-3634 NEW YORK 2, NEW YORK

CHEMISTRY—Michell J. Sienko and Robert A. Plane—*McGraw*, 2nd ed., 623 p., illus., $7.50. First-year college course emphasizing principles, with hundreds of problems that call for comprehension in their solution.

CHEMISTRY: Man's Servant—Leonard J. Fliedner and Louis Teichman—*Allyn*, rev. ed., 625 p., illus., $5.48. Beginning textbook, emphasizing chemistry as it exists today.

THE CHEMISTRY OF NUCLEIC ACIDS—D. O. Jordan—*Butterworths*, 358 p., illus., $10.50. Comprehensive treatment of the chemistry and structure of nucleic acids.

THE CHOICE OF A MEDICAL CAREER: Essays on the Fields of Medicine—Joseph Garland and Joseph Stokes III, Eds.—*Lippincott*, 231 p., $5. Leaders in their respective fields of medicine present the growth and present state of their specialty.

CLASSICS IN PSYCHOLOGY—Thorne Shipley, Ed.—*Philosophical Lib.*, 1,342 p., $20. Selections, many full-text, others not previously translated, from leading psychologists and psychiatrists, covering every major school in the field over the past 150 years.

CONTEXT: A University of Chicago Magazine, Vol. I, No. 1—Carl W. Larsen, Ed.—*Univ. of Chicago*, 36 p., illus., paper, quarterly available to friends of the University from Office of Public Relations, Chicago 37, Ill. Contains special 12-page report on Chancellor George W. Beadle.

THE CRISIS IN AMERICAN MEDICINE—Marion K. Sanders, Ed., foreword by John Fischer—*Harper*, 149 p., $3.75. Much expanded version of articles first published in Harper's Magazine of October, 1960.

A DEVICE AND TESTS FOR MEASURING INTELLECTUAL FUNCTIONS DURING ACCELERATION—Irwin Miller, George B. Simon and Edwin Cohen—*WADD (OTS)*, 43 p., illus., paper, $1.25. Report on tests with LIFT device used with human centrifuge.

ELECTROLYTIC DISSOCIATION—C. B. Monk—*Academic*, 320 p., $10. Intermediate level treatment in the properties of electrolytes, and mostly concerned in the study of their dissociation in solution.

ELECTRONIC DRAFTING HANDBOOK—Nicholas M. Raskhodoff—*Macmillan*, 402 p., illus., $14.75. Shows how to prepare every kind of electronic drawing: schematics, wiring diagrams, working drawings, interconnections. Includes 156-page reference appendix.

FAMILY SPENDING PATTERNS AND HEALTH CARE—H. Ashley Weeks and others, foreword by Odin W. Anderson—*Harvard Univ. Press*, 140 p., $3.50. Based on survey of 500 middle-income families in one community.

THE FIFTEEN WONDERS OF THE WORLD—Rene Poirier, transl. from French by Margaret Crosland—*Random House*, 400 p., illus., $5.95. The story of human achievement in great feats of engineering, ranging from the Pyramids to the Oak Ridge atomic power project.

FILTERS AND ATTENUATORS—Alexander Schure, Ed.—*Rider, J. F.*, 87 p., paper, $2.25. Explains functions, types, circuity and applications of filters and attenuators.

THE FUTURE METROPOLIS—Lloyd Rodwin, Ed.—*Braziller*, 253 p., $5. Evaluation of the basic features and problems of the modern phenomenon of vast urban development, by a variety of specialists.

GARDENING WITHOUT WORK: For the Aging, the Busy and the Indolent—Ruth Stout—*Devin-Adair*, 214 p., illus. by Nan Stone, $3.95. Entertaining reading about short-cuts to producing vegetables and fruits in your garden.

GEOCHRONOLOGY OF ROCK SYSTEMS—J. Laurence Kulp, Ed.—*N.Y. Acad. of Sciences*, Annals, Vol. 91, Art. 2, 435 p., illus., paper, $5. Conference papers on methodology, means of dating sedimentary rocks and continent-by-continent discussion of the age of basement rocks.

HEALTH IN CHILDHOOD—Richard W. B. Ellis—*Penguin*, 251 p., photographs, paper, $1.25. Concise account of the factors that favor health in childhood, tracing child's development from conception, through birth and infancy, to puberty.

HOUSE OF HEALING: The Story of the Hospital—Mary Risley—*Doubleday*, 288 p., illus., $4.50. A layman's history of the hospital from Babylon, Egypt, Greece and Rome to the great medical centers of today.

HOW TO GUIDE YOUR CHILD'S EDUCATION—Robert E. Wilson—*Harper*, 129 p., $3.50. Informal handbook answering questions of parents who have school children of all ages.

HOW TO SOLVE PHYSICS PROBLEMS—Edwin M. Ripin—*Rider, J. F.*, 122 p., illus., paper, $1.80. Meant as an aid to the high school physics teacher, uses dimensional technique in solving 200 physics problems.

HUMAN HEREDITY—Jean Rostand, transl. from French by Wade Baskin—*Philosophical Lib.*, 139 p., illus., $4.75. Basic and complex facts of human heredity, written by scientist for the layman.

LISTEN AND LEARN: Portuguese—*Dover*, three 12-inch long-playing records and manual, $5.95. Dual-language recording of more than 800 practical sentences for the traveler.

LONDON IN COLOR—Introd. by Neville Braybrooke—*Viking*, 71 p., photographs, $3. City views with background information.

THE LONG ROAD TO MAN—Robert L. Lehrman—*Basic Bks.*, 192 p., illus. by author, $3.95. The story of the evolution of animal life, written by high school biology teacher for those of his students who want to know more than the textbook offers.

MAN AND THE MOON—Robert S. Richardson—*World Pub. Co.*, 171 p., illus. by Chesley Bonestall, photographs, $6.50. Popularly written commentary on imaginary and planned space flights to moon, and description of lunar surface features.

MAN IN PROCESS—Ashley Montagu—*World Pub. Co.*, 313 p., $4.50. Anthropologist, in most readable language, analyzes man's process of learning to be a more rational human being.

MEASURE, LEBESGUE INTEGRALS AND HILBERT SPACE—A. N. Kolmogorov and S. V. Fomin, transl. from Russian by Natascha Artin Brunswick and Alan Jeffrey—*Academic*, 147 p., $4. Second volume of two-volume work entitled *Elements of the Theory of Functions and Functional Analysis.*

THE MECHANISM OF EVOLUTION—W. H. Dowdeswell—*Harper*, 2nd ed., 115 p., illus., paper, 95¢. Presents the main ideas prevalent today concerning the evolutionary trends and shows how the process of evolution can be studied experimentally.

MENTAL HEALTH IN THE UNITED STATES: A Fifty-Year History—Nina Ridenour—*Harvard Univ. Press*, 146 p., $3.50. Readable short history of the mental health movement from its beginnings in 1908, when the Connecticut Society for Mental Hygiene was organized.

THE METALLURGY OF SEMICONDUCTORS—Yu M. Shashkov, transl. from Russian by J. E. S. Bradley—*Consultants*, 183 p., illus., $9.50. Sur-

veys in detail the semiconductor metallurgy of germanium and silicon.

MICHAEL FARADAY: A List of His Lectures and Published Writings—Alan E. Jeffreys, foreword by Sir Lawrence Bragg—*Academic* for the Royal Institution of Great Britain, 86 p., illus., $7. Lists in chronological order Faraday's books, articles, papers, letters to the Press, lectures and manuscript lecture notes.

MICRO-ORGANISMS AS ALLIES: The Industrial Use of Fungi and Bacteria—C. L. Duddington—*Macmillan*, 256 p., illus., $5.95. Describes the world of industrial microbiology in non-technical terms, the yeasts of brewer, distiller and baker, moulds and antibiotics, vinegar, and nitrogen fixers.

A MIDWESTERN ALMANAC: Pageant of the Seasons—Austin L. Rand and Rheua M. Rand—*Ronald*, 176 p., illus. by Ruth Ingeborg Andris, $4.50. The annual cycle of birds, mammals, frogs, insects and plants, by zoologist-naturalist husband-wife team.

MILK: The Mammary Gland and Its Secretion, Vols. I and II—S. K. Kon and A. T. Cowie, Eds.—*Academic*, 515 p., illus., 423 p., $14, $12. First volume treats morphogenesis, structure, growth, functional physiology and biochemical activities; second volume discusses nutrition of lactating animals and nutritional value of milk.

MODEL ROCKETS FOR BEGINNERS—H. H. Gilmore—*Harper*, 115 p., illus. by author, $2.50. Shows young boys how to make simplified models of real rockets described.

MODERN COMPUTING METHODS—C. W. Clenshaw and others—*Philosophical Lib.*, 2nd rev. ed., 172 p., $6. Working manual for scientists and engineers and basis for courses in numerical analysis.

MUSIC OF THE SPHERES—Guy Murchie—*Houghton*, 644 p., illus. by author, $6.95. Facts and speculations of the world of astronomy and astrophysics in vivid, non-technical language, with author's original explanatory drawings.

NATIONAL PLANT CONSERVATION GUIDE—Ethel Magwood Burns—*Nat. Council Bks.*, unpaged, illus. by James E. Owens, $3; paper, $2. State-by-state compilation of data on official flowers, birds, trees and plant preservation lists.

NATURE'S YEAR: The Seasons of Cape Cod—*Doubleday*, 199 p., woodcuts by David Grose, $4.50. Precise observations of nature through the changing seasons.

THE NERVE OF SOME ANIMALS—Robert Froman—*Lippincott*, 250 p., illus. by Charles Hargens, $4.95. True stories about individual wild animals in their encounters with man.

NEW LAWS FOR NEW FORESTS: Wisconsin's Forest-Fire, Tax, Zoning and County-Forest Laws in Operation—Erling D. Solberg—*Univ. of Wis. Press*, 611 p., $7.50. Report examines and discusses the operation of laws designed to reforest the cutover counties of Wisconsin.

THE ORION BOOK OF BALLOONS—Charles Dollfus—*Orion*, 108 p., 70 illus., $6.95. History of ballooning, attractively presented for general reader.

THE ORION BOOK OF EVOLUTION—Jean Rostand, transl. from French—*Orion*, 102 p., 70 full-page photographs, $6.95. Well-known experimental biologist offers general reader a survey of the history of the idea of evolution and concludes with projection of man's genetic future in the atomic age.

PEACETIME USES OF ATOMIC ENERGY—Martin Mann—*Viking*, rev. ed., 191 p., 100 photographs, $5. Popularly written and up-to-date review of the many uses of the atom in medicine and agriculture, industry and research.

PERSPECTIVE IN VIROLOGY, Vol. II—Morris Pollard, Ed.—*Burgess*, 220 p., illus., $8. Proceedings of symposium sponsored by the Gustav Stern Foundation in honor of Peyton Rous.

PETER AND CAROLINE: A Child Asks about Childbirth and Sex—Sten Hegeler, introd. by Alexander Adler, M. D. and W. C. W. Nixon, M. D.—*Abelard-Schuman*, 35 p., illus. by Gerda Nystad, $2. Intended to help mother meet the problem when a child first asks about sex.

THE PHYSICAL PRINCIPLES OF ASTRONAUTICS: Fundamentals of Dynamical Astronomy and Space Flight—Arthur I. Berman—*Wiley*, 350 p., illus., $9.25. Concise but thorough presentation of the basic principles of the science and technology of the placement and control of manned and unmanned objects in space, on a beginning-graduate level.

THE RACE TO THE SOUTH POLE—William Bixby—*Longmans*, 215 p., $3.25. Tells young people the story of Antarctic exploration between 1901 and 1913.

REPORT OF THE MISSION TO THE SEVEN UNIVERSITIES OF CHILE, with Appendices—Harry M. Miller, Sr., Project Coordinator—*Nat. Acad. of Sciences-Nat. Res. Council*, 95 p., 132 p., paper, free upon request direct to publisher, Office of International Studies, 2101 Constitution Ave., Washington 25, D. C. Study prepared for the International Cooperation Administration.

SCOTLAND IN COLOR—Fred Urquhart—*Viking*, 72 p., photographs by Kenneth Scowen, $3. Picture book of Scottish landscapes and landmarks with text.

THE STRANGE WORLD OF ANIMAL SENSES—Margaret Cosgrove—*Dodd*, 94 p., illus. by author, $3. Explains for boys and girls unusual facts in the development of senses up through the various animal groups.

TABLES OF ALL PRIMITIVE ROOTS OF ODD PRIMES LESS THAN 1000—Roger Osborn, foreword by Harry S. Vandiver—*Univ. of Texas Press*, 70 p., $3. Valuable tool for number theorists.

THE TEACHING OF ARITHMETIC—Herbert F. Spitzer—*Houghton*, 3rd ed., 352 p., $5. New edition presents more specific teaching procedures and gives more space to fundamental processes with whole numbers.

THE THEORY OF CRYSTAL STRUCTURE ANALYSIS—A. I. Kitaigorodskii, transl. from Russian by David and Katherine Harker—*Consultants*, 275 p., $12.50. Monograph on the construction of a complete theory of the relationships between structure amplitudes.

TRANSFORMERS—Alexander Schure, Ed.—*Rider, J. F.*, 82 p., illus., paper, $2. Discusses transformer theory and various types of transformer operations and applications.

TWENTY-THOUSAND LEAGUES UNDER THE SEA—Jules Verne—*Associated Booksellers*, 192 p., $3. Reprint of classic about the voyage of the fictitious submarine "Nautilus."

VECTORS IN THREE DIMENSIONAL GEOMETRY—Abraham M. Glicksman—*Nat. Council of Teachers of Mathematics*, 47 p., illus., paper, $1.20. Presents fairly rigorous treatment of vector algebra, interspersed with geometric interpretations and applications.

X-RAY ANALYSIS OF ORGANIC STRUCTURES—S. C. Nyburg—*Academic*, 434 p., illus., $13. Presents X-ray structural method with a minimum of formal mathematics, and gives survey of the organic and biological materials that have so far been examined.

YOU AND YOUR DOCTOR: The Common Sense Guide to Medical Care—William H. Potter, M.D.—*Duell*, 288 p., $5. Practising physician discusses choice of physician, "embarrassing" questions, hospitals, medical care plans and cults.

YOUNG PEOPLE OF EAST ASIA AND AUSTRALIA: Their Stories in Their Own Words—Charles R. Joy—*Duell*, 183 p., Maps, $3.50. Simple family stories of young Asians and Australians.

YOUR 35mm PROJECTOR NOW

WILL Z-O-O-M MICROSCOPE SLIDES!

- New f1.5 Elgeet Zoom Microtar Attachment converts your projector for continuously variable magnification of slides
- Focus at any magnification—zoom image stays sharp
- Zoom magnification dramatizes the projected image for lectures, demonstrations
- True, variable iris controls field size for concentration of interest on select areas
- Positive lock spring device secures slide
- Adapters fit unit to most popular 35mm slide projectors; unit removes instantly for normal projector use
- Complete Elgeet Zoom Microtar Attachment—with appropriate adapter for your projector—$64.50

When ordering, please specify make and model of projector you will be adapting. For further details or for orders, write to: DEPT. SN-6

SCIENTIFIC INSTRUMENT DIVISION

Elgeet

Elgeet Optical Co.
838 Smith Street,
Rochester, N. Y.

THE

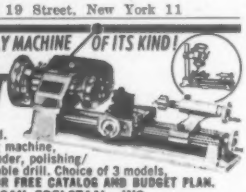
Holiday Painter

by J. Martin-Barbaz. A book for the serious amateur. Provides a vast amount of detailed instruction. Can save the tyro from endless fumbling, wrong habits, wasted motion. Helps him arrive at own philosophy of art; develop own unique style; achieve artistic independence, artistic integrity.

Self-teaching • Fully illustrated
$2.95 Postfree • 10-day money-back guarantee

EMERSON BOOKS, Inc., Dept. 269-M
251 West 19 Street, New York 11

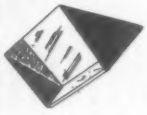
6-IN-1 UNIMAT ONLY MACHINE OF ITS KIND!



Compact workshop for all metal, plastic, wood. Precision lathe, milling machine, drill press, surface grinder, polishing/grinding machine, portable drill. Choice of 3 models, from $64.50. WRITE FOR FREE CATALOG AND BUDGET PLAN.
AMERICAN EDELSTAAL, INC.
Dept. OG, 350 Broadway, New York 13, N. Y.

Trap Your Own Rainbow

PRISM $8.00 p.p.

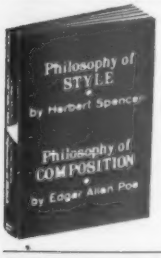


Brilliant water-white crystal —45°-90°-45°. Faces flat to highest tolerances. Wt. 10 oz. Size 3 ½ "x 2 ¼ "x 1 ⅝ ", of best optical glass. Cost gov. no less than $30.00. Until you have witnessed the glory of a spectrum (rainbow) cast by this prism with sunlight you have not been truly happy.
2 for $12.00 p.p.

HARRY ROSS *Scientific & Lab Apparatus*
61-L Reade St., N.Y. 7, N.Y.

FREE BOOK!

"Dover Science Sampler," 64-page book, with entertaining, instructive selections from Mach, Galileo, Newton, Poincare, Hubble, Steinman, etc. Island universes, fata morgana, genetics, phase rule, etc. Entirely free, no string attached; no obligation, no salesmen will call. Supply limited, write now. Dept SNL. DOVER, 180 Varick St., N. Y. 14, N. Y.



IF YOU WRITE FOR MONEY!

Enrich your writing by applying Herbert Spencer's and Edgar Allan Poe's classic principles that have inspired many of the world's greatest authors. Indispensable if you want to get published! Send $1.00 to
FAGEANT PRESS
Dept. SN
101 5th Ave., N.Y.C. 3.

MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists.
25¢ per word, payable in advance. Closing date 8 weeks prior to publication (Saturday).
SNL, 1719 N St., N.W., Washington 6, D. C.

GOVERNMENT SURPLUS RADIOS, RECEIVERS, transmitters, gadgets, parabolic reflectors, infra-red snooperscopes, aircraft camera lenses. Amazing catalog 10¢. John Meshna, Malden 48, Mass.

NATIONAL GEOGRAPHIC MAGAZINES, 1888-1960, any issue. Periodical Service. Box 465-SN., Wilmington, Delaware.

NEW LIQUID CASTING PLASTIC, CLEAR, COLors. Embed real flowers, minerals, biological specimens, delicate instruments, electronic parts. Also cold setting resin and fiberglass for laminating, casting, molding, coating. Manual 25¢. Castolite Company, Dept. G-30, Woodstock, Illinois.

PERIODIC CHART—POCKET SIZE! PLASTIC laminated. All elements, atomic weights, densities, valences, etc. Send $1.00. R. and S. Laminating Co., Box 111, Dept. 3, White Plains, New York.

TEACHERS—GOLD ORE SPECIMEN WITH real gold particles. Enlivens student interest in rocks and minerals. $1.00 Ppd. Bartlett Scientific, 282 Oakwood, Route 2, Lemont, Illinois.

INVENTION

Patents of the Week

A technique for welding metals used in jets and space probes was patented. Other new inventions are a telephone answering system and a process for treating wool on the hoof.

➤ THE SPACE AGE has come to the metal-working industry with a new patented technique for welding metals used in jets and space probes.

James S. Kirkpatrick of Dearborn, Mich., has patented a method, No. 2,985,129, for welding such valuable metals as titanium, zirconium and molybdenum. Rights were assigned to Brooks & Perkins, Inc., Detroit.

The welder, wearing a glass or plastic mask, does all welding in a huge tank with a controlled atmosphere. All oxygen, which easily combines with the metals during welding to form bothersome oxides, is removed from the chamber and is replaced by an inactive gas such as helium or argon. A pair of sleeved armholes below a view glass near a working bench permits another person outside the tank to assist the welder.

A telephone answering service system that does not require complicated wiring won patent No. 2,985,721 for Ernest H. Gatzert of Rochester, N. Y., assigned to General Dynamics Corporation, also of Rochester. A control circuit can switch as many as 100 subscribers over a few telephone lines to a secretarial answering service.

A process of treating wool still growing on the hoof was invented by an Australian. Roland Joseph Fitzgerald of Sydney received patent No. 2,985,136 for a solution containing soap, sodium or potassium silicate and water that removes excess wool waxes, dirt and unpleasant odors from the growing wool. The sheep is bathed in the solution, which forms a coating on the wool. During the next rainfall or bath, the water-soluble coating then carries away dirty material from the sheep.

A wheeled bed or stretcher for transferring hospital patients to a regular hospital bed was invented by Axel E. F. Johnson of Cincinnati, Ohio, who assigned rights of patent No. 2,984,843 to American Hospital Supply Corporation, Evanston, Ill. The bed or stretcher can be raised, lowered or tilted laterally in order to transfer the patient with minimum discomfort.

An incinerator on wheels for city and town sanitation departments burns to ashes all refuse collected by the truck during a normal day's work. The invention, patent No. 2,985,120, was designed by John B. Brandt, Melbourne A. Noel, Harry J. Kelly and John J. Burns of Chicago, and rights were assigned to Mobile Incinerators, Inc., Chicago.

• Science News Letter, 79:366 June 10, 1961

ROENTGENOLOGY

Sterility From Radiation

➤ MALE RATS are more sensitive to radiation than females, the Radiation Research Society was told in Washington, D. C. The males become sterile when given radiation doses that cause no loss of fertility in the females.

Drs. Sidney O. Brown and George M. Krise of A. & M. College of Texas, College Station, reported that under continuous gamma radiation amounting to 5, 10 or 20 roentgens per day, female rats produced a normal number of offspring. The offspring were normal except that those in the 20-roentgen group were smaller and weighed about 15% less than normal.

As the rat babies grew, however, their spleens proved to be a little smaller than usual and all the males in all the groups became sterile when they had received about 400 roentgens of radiation. The testes were abnormally small, and microscopic examination showed that germinal cells were greatly reduced.

Dr. Brown said the males "did not know they were sterile." The tissue between the sperm-producing cells manufactures the sex hormones, and since this tissue was mostly intact, the males behaved normally.

In another group of rats receiving only two roentgens a day, the testes are small, but these rats are not sterile. The rats are in their seventh generation and have always been exposed to radiation. After the tenth generation, comprehensive studies of the effect of continuous radiation exposure will be made. Dr. Brown offered to give some of the rats to other investigators for study.

Whether the male sterility versus female fertility is applicable to humans is not known at present, Dr. Brown said. A 2,000 curie radiation source is being built at the college for study of animals larger than rats.

• Science News Letter, 79:366 June 10, 1961

Questions

NATURAL RESOURCES—Which process for desalting water has the greatest potential at present? p. 355.

SPACE—Why will men be more effective than machines in deep space? p. 357.

Photographs: Cover, The Martin Company; p. 355, Ryan Aeronautical Company; p. 357, Olin Mathieson Corporation; p. 359, University of California; p. 362, National Aeronautics and Space Administration; p. 368, Minnesota Mining and Mfg. Co.

MEDICINE

Common Cold Progress

➤ THERE IS ENCOURAGING NEWS about man's fight against the common cold and, even more important, the RS often fatal respiratory infection that now kills thousands of little children.

RS virus, the culprit in fatal respiratory infections of little babies, will soon be attacked by a vaccine, when and if a program urged by the Journal of the American Medical Association 176:647, 1961, gets underway. RS stands for respiratory syncytial.

The AMA editorial states that vaccines are urgently required against viruses like RS "because of the need to modify the serious consequences of primary infection in infancy and childhood."

The disease-producing organism was first recognized as a human virus in 1956 by a group working with Dr. Robert M. Chanock of the National Institute of Allergy and Infectious Diseases, National Institutes of Health.

Dr. Chanock and his associates have since then recovered 56 strains of RS virus from 346 infants and children treated at Children's Hospital, Washington, D. C., for respiratory ills from March through July, 1960. They found only four strains of RS virus among 272 children who did not have respiratory ailments.

The investigators say the presence of RS antibodies in adults would make it difficult to raise the level of protection in this age group against the illness because a vaccine could not be expected to increase their antibodies. But this is not true of infants and children.

Working with Dr. Chanock at the National Institutes of Health were Dr. Karl M. Johnson and Christine Cumming, R.N., and Drs. Hyun Wha Kim, Andrew J. Vargosko, Robert H. Parrott, with Ann Deleva, Research Foundation, Children's Hospital.

• Science News Letter, 79:367 June 10, 1961

MEDICINE

Hysterectomy Before 50

➤ TOO MANY surgeons fail to ask "Is this operation necessary?" when taking out the uterus and especially the ovaries, a Buffalo obstetrician and gynecologist told the International College of Surgeons in Chicago.

Dr. Clyde L. Randall said that although the majority of benign tumors develop in younger women, eight among nine malignancies of the ovary develop after the patient's 50th year.

"If uterine and ovarian removal are to be advised on the basis that frequently fatal malignancies can thus be prevented," Dr. Randall said, the undesirable effects of such surgery can "probably be minimized by reserving this recommendation and the performance of this surgery until the climacteric years (currently nearer 50 than 45)."

The risk of preserving the ovary in the face of the fact that nine out of 1,000 women in the State of New York alone are now developing malignancy of this organ was pointed out, but its function both before and after menopause was emphasized.

Hardening of the arteries and high blood pressure were mentioned as occurring more frequently among women whose ovaries had been removed, thus depriving them of hormones believed to protect them from vascular change.

The removal of the uterus alone in younger women, Dr. Randall said, does not appear to be followed by hypertension.

With 40 out of each 1,000 women apparently destined for some form of uterine cancer, early detection of malignancy and surgical removal of the uterus is saving many lives, the speaker indicated. But the removal of a normal ovary in a young woman on the chance that it might some day become cancerous seems unjustified.

• Science News Letter, 79:367 June 10, 1961

GENERAL SCIENCE

Science Club Workshops

➤ WHEN DOZENS of science club officers and sponsors spend a day together in a Science Clubs of America Workshop, ideas, arguments, questions, and reports of successes and failures are poured into the common pot to brew a potent tonic.

One of these SCIENCE SERVICE conferences was held at Seattle University on Saturday, May 20, for Washington State clubs affiliated with Science Clubs of America. Club sponsors and one officer from each club were invited to attend and to bring in ideas and problems to exchange with other participants.

In April a Science Youth Activities Conference was held at Roanoke College, Salem, Va., for some 80 educators, science fair directors and scientists. Club activities, the Junior Academy of Science, science fairs, science education and the national and state Science Talent Search were discussed.

The University of New Mexico in Albuquerque was host to another workshop in November. This one included both adult and student groups and was attended by school superintendents, science supervisors, principals, teachers, club sponsors and science club officers. Panels and informal discussions covered opportunities and programs offered to science-oriented students.

The response to such work sessions has inspired some of the participants to set up similar sessions in their own localities.

• Science News Letter, 79:367 June 10, 1961

SCIENCE BARGAINS

Order by Stock No.—Send Check or M.O.—Satisfaction or Money Back!

BE THE FIRST ATOMIC GARDENER IN YOUR NEIGHBORHOOD

Take part in the "anything can happen" planting adventure of the century. Plant atomic energized flower and vegetable seeds —indoors or out. Kits include 8 seed packets—4 energized with gamma rays and 4 untreated. Energized seeds are absolutely safe — completely unpredictable — may produce plants and flowers that are larger, more productive, different shapes, unusual colors—just about anything. Normal plants provide comparison. Vegetables: tomato, corn, lettuce, radish. Flowers: petunia, zinnia, marigold, aster. Complete with charts, pictures, instructions.

Stock No. 70,421-Q Vegetable Kit....$3.95 Pstpd.
Stock No. 70,422-Q Flower Kit.....$3.95 Pstpd.

ATTENTION TEACHERS!

Elementary through college! New 96-page CATALOG of useful classroom learning and teaching aids. Science, math, physics, astronomy, biology, etc. Request EDUCATIONAL CATALOG—"Q".

'FISH' WITH A MAGNET

Go Treasure Hunting on the Bottom

Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—a terrific bargain. Lifts over 125 lbs. on land —much greater weights under water. Order now and try this new sport.

Stock No. 70,183-Q. 5-lb. Magnet...$9.95 Postpaid

NEW LOW PRICE FLASHLIGHT POINTER

. . . Point It Out With Projected Arrow

Ideal for pointing out interesting features on movie and slide projection screens. Excellent lecture tool. For teacher use on maps, etc. Flashlight focuses an arrow where you point it.

Stock No. 60,117-Q.....$5.95 Postpaid

HAND BLOW TORCH—HOT PRICE!

Easy to use, safe, adjustable flame. Simply light fuel tablet —blow into plastic tube—you are ready to go. Dozens of uses at home or workshop.

Stock No. 60,204-Q . . . $1.85 Postpaid

WOODEN SOLID PUZZLES

12 Different puzzles that will stimulate your ability to think and reason. Here is a fascinating assortment of wood puzzles that will provide hours of pleasure. Twelve different puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, young or old, to test skill, patience, and, best of all, to stimulate ability to think and reason while having lots of fun. Order yours now

Stock No. 70,206-Q.....$3.00 Postpaid

BUILD A SOLAR ENERGY FURNACE

A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14" diameter . . . f.l. 14".

Stock No. 70,130-Q, Fresnel Lens, $6.00 Postpaid

FREE CATALOG-Q

144 Pages! Over 1000 Bargains!

America's No. 1 source of supply for Science experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories — Telescopes, microscopes, binoculars, infrared snipperscopes . . . items for making "Science Fair" projects, math learning and teaching aids. Request Catalog Q.

TEACHERS! Write for Educational Catalog Q-2

EDMUND SCIENTIFIC CO.
BARRINGTON, NEW JERSEY

• New Ideas and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1095. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

⚙ *TRAVEL-CLOCK RADIO automatically wakes you up on your travels. The compact, six-transistor clock radio has an alarm, light and the radio to make sure you get up. It closes into a compact unit for easy storage or carrying.*

• Science News Letter, 79:368 June 10, 1961

⚙ *SAFETY SHIELD of plastic and lead protects laboratory worker from injury as well as guarding apparatus from accidental breakage. The portable, curved plastic shield, with weighted lead base for stability, wraps around the laboratory equipment, permits full visibility and is easy to reach around.*

• Science News Letter, 79:368 June 10, 1961

⚙ *POCKET-SIZE STOVE of steel can be used to prepare outdoor meals, warm baby bottles, or act as a torch. The self-regulating unit burns gasoline, lighter fluid and even kerosene; one filling of five-ounce container lasts one and a half hours. The stove is only 5 by 4½ by 1⅞ inches and weighs one and a half pounds.*

• Science News Letter, 79:368 June 10, 1961

⚙ *LINT REMOVERS, shown in the photograph, are convenient pads which slip over the hand for easy use. Each pad is coated with high tack adhesive, covered with a protective liner. To use, slip pad on hand, remove liner and pat article gently to lift off lint, dust, threads or hair. The pads come six to a pack and can be carried conveniently in purse, pocket or auto.*

• Science News Letter, 79:368 June 10, 1961

⚙ *OXYGEN SUPPLY UNIT for private aircraft provides quick assistance in case of a heart attack or other emergency. Unit supplies 51 minutes of oxygen and comes complete with the oxygen cylinder, regulator, plastic mask and carrying case. The unit could be used also for oxygen supply at high altitudes.*

• Science News Letter, 79:368 June 10, 1961

⚙ *SAFETY LOCK prevents burglars from breaking in by picking lock or smashing a glass panel and releasing the lock. It cannot be opened from outside by turning or moving the knob. Easily mounted with tamper-proof screws, the lock can also be used on cabinets, windows or closet doors.*

• Science News Letter, 79:368 June 10, 1961

⚙ *FAST WRITING METHOD for busy students and businessmen can be learned in just two hours. The do-it-yourself method is based on the alphabet and features a short form for the 50 most used words in the English language, accounting for nearly half of everything written.*

• Science News Letter, 79:368 June 10, 1961

⚙ *OPTICAL ILLUSION KIT of rotating disks produces colors from black and white disks, changing shapes and even objects that are not there. Kit also demonstrates hypnotism and how old-time movies worked. Unit includes 13 five-inch disks, battery holder and rheostat, tiny motor and instruction booklet.*

• Science News Letter, 79:368 June 10, 1961

Nature Ramblings

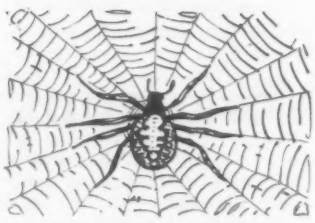
➤ IN THE RELATIONSHIP between the spider and the fly, the spider typically is cast as the villain. But in the presence of the hunting wasp, the spider assumes the victim's role and frequently uses ingenious devices to conceal its own identity.

In some cases it does so by mimicking the ant, a creature which is not only unattractive to but avoided by the hunting wasp. The spider, with eight legs, may place its front pair of legs over its forehead and wiggle them to and fro. In this posture, it has the appearance of the six-legged ant with antennae in front. To further the disguise, the spider moves with the hurried and jerky gait of the ant. When the two species are moving, it is difficult to tell them apart.

On two occasions, reliable naturalists have found a spider wearing the hollow shell of an ant over its head and shoulders. Thus, these arachnid actors not only imitate the ant, but may also dress up for the role.

Several kinds of spiders live with ants,

Incognito Spider



and natural selection over the ages has singled out those that look and act most like their smaller roommates.

Still others have come to resemble the wasps themselves. They cannot grow wings, but there are such things as wingless wasps. One such wasp, found in Uganda, has four large white spots on its upper abdomen. Two spiders with similar spots were found running about among the wasps, happily enjoying immunity from the deadly sting.

• Science News Letter, 79:368 June 10, 1961

Do You Know?

Polluted air poisons many *plants* in the United States, destroying the older leaves first and gradually killing the entire plant.

A completely automatic *parking* system that transports each individual automobile from street level to its parking place and returns it to street level with neither the driver nor an attendant going up with it is being constructed in England.

Polio was first accurately described in 1789 by a British physician.

Americans are the world's greatest *coffee* drinkers, consuming about 400,000,000 cups daily at a per capita rate of nearly 16 pounds annually.

In 1960 corn borers destroyed more than 3,000,000 tons of *corn*, worth $96,085,000, in the United States.

Atomic *radiation* might soon be used for curing leather commercially.

• Science News Letter, 79:368 June 10, 1961